

FIGHTING FOREST FIRES - THEN AND NOW

By Theodore Shoemaker
(Retired 1938)

Another of those dry lightning storms that regularly visits the forested sections of Montana and Idaho in July and August was in progress. This one was of the cloud-to-ground variety that means trouble in such dry seasons as this had been.

From the big west window of my home, set up a notch above the other homes in the neighborhood, I was observing the display and counting the seconds after the most vivid flashes before the thunder reached me. By this means I could approximate the location of the so-called "hot" strikes, and from my knowledge of the fuels in the various drainages I was getting a picture of the likelihood of fires spreading rapidly to large size.

Following the usual course, this storm was coming up out of the Lochsa across the Bitterroot Range and on toward Missoula, supervisor's headquarters of the Lolo Forest, one part of which was being threatened. The supervisor and his assistants would be on the alert. Doubtless they had already called the rangers on the districts outside the path of the storm to stand ready on short notice to go to the aid of their comrades, and had sent word around to the various places where idle men congregate telling them that fire fighters might be needed.

Smokejumpers, and the planes and pilots to carry them on their missions, would have been designated and standing ready to take off upon receipt of the dispatcher's orders. In short, readiness in all its many details would have been achieved and translated into action with speed and precision when the time came.

Although miles away, I had the equivalent of a ring-side seat at one of nature's spectacular shows - a veritable deluge of lightning strikes, with an almost complete lack of rain to counteract the destruction they presaged. So far as I know, no other place in the world is subjected to an intensity of fire-setting lightning strikes that even approaches the visitations which come to scourge the mountainous regions of Montana and Idaho almost every summer. It is not uncommon for a single storm to set a hundred fires, and in one series of storms more than 500 fires were set within a 48-hour period. That is where the smokejumpers save the day, unless too many of their limited number are already out on fires or wind and low visibility make it too hazardous to drop them.

But, to come back to this storm which was steadily approaching. Suddenly there came a flash that added brilliance to the full light of day, and there was no doubt about this strike going to the ground, or about its nearness, for I distinctly felt the jar. It hit in the dense stand of timber that covers the whole broad slope leading up toward Lolo Peak, so there was small chance that it would not start a fire, and if it did it would be a miracle if it did not go into the crowns and start traveling before men could get to it. It seemed that nature was all out of miracles just then, for smoke soon began showing above the forest canopy, and some 20 minutes later a column of black smoke began billowing upward - a sure sign of a crown fire.

This would be on Ranger Bill's district. I knew Bill very well and could guess how he would handle the situation. At the first reports from his lookouts pinpointing the location of the fire he would check these against his fuel-type maps and take into account the rated fire danger and the direction and velocity of the wind. This would tell him that fast action was called for. He would immediately order eight or more smokejumpers. Later when the fire began to crown he would give his dispatcher complete instructions about ordering fire fighters, equipment and pack strings, and about rallying resident cooperators and sawmill and logging crews. This done, he would set out for the fire himself.

He would drive, and fast, to the intersection with whatever trail leads nearest the fire. There he would doubtless find some of his cooperators, and would assign one of them to stay there to direct all traffic en route to the fire. With the others he would hike up this trail to the point best suited for a takeoff to the fire. There he would set up a roadblock - rather, a trail block - and immediately set to work clearing a pack trail to the fire. Other local men and logging crews would soon join them, after which Bill would have all he could do to scout for location and blaze the way ahead of them, for they would be both willing and chock-full of know-how.

At the fire, having approached it from the windward or safe side, a camp-site would be selected and a small, select crew put to work clearing, constructing tables out of poles, and digging latrines and garbage pits. The rest of the men would join the smokejumpers, already on the job, and build fireline to safeguard the camp and facilitate stringing out the fire fighters when they arrived. By means of his walky-talky radio Bill would know about when to expect them, also, how fast the fire would be traveling, it having been scouted by plane soon after it began to crown.

Of course, Bill would have an objective and a plan for reaching it. He would know if at all possible that he must cut off the head of the fire by noon of the following day to prevent another run in the afternoon. He would have estimated how far the fire would travel before the cool night air forced it down out of the crowns, limiting its advance during the night to a few yards. A plane would scout the fire again near sundown and report directly to him how far the fire had traveled and its behavior. This would enable him to check on his manpower needs and revise his orders should that seem advisable.

The first fire fighters would reach the fire before dark and work throughout the night building lines, flanking the fire on either side all the way to its head, provided Bill could get as many men as he ordered and his estimate of the length of line and the output per man-hour were correct. He would have ordered additional men to go to work at daylight to cut off the head of the fire and put out the spot fires. These men would have to be flown in to Missoula from Spokane, Butte and Great Falls, but should arrive in time for his purpose.

This storm, this fire, and the action so far, are hypothetical. They are, nevertheless, typical in all respects, and have been described in detail in order to picture the lightning fire problem facing the men of the Forest Service in this region and show how they would solve it; also, and mainly, to list the facilities now available compared with those at the command of the men who bore the brunt of the fight 40 or even 20 years ago. Let us then leave this fire, typical though it be, and go back to the very beginning, when there were none of those facilities, and try to trace the progress from 1905 to the present time.

This can best be done by giving an account of a few actual fires, and dramatizing somewhat the seasons of outstanding fire danger that serve as milestones by which to measure the progress that has been made. Except for the first fire I shall describe, what follows relates to Region 1 of the Forest Service which includes all of Montana, Idaho north of the Salmon River, and the northeast corner of Washington. Each of the other nine regions presents problems of its own in relation to fire control, and it appears safe to assume those regions have all made satisfactory progress toward their goals in the prevention and suppression of fires.

The first fire I had anything to do with I had to take charge of. I was alone at the time as acting supervisor of two Colorado forests, and there was not another forest officer within a day's ride to call on for help. Before I knew there was a fire it was throwing a column of smoke hundreds of feet up in the air. There were no lookouts or cooperators to report fires in those days (1908). When a man casually called from my office door to ask whether I knew I had a fire, and I went to look, dozens of the townfolk were out gazing at the spectacle but not one had thought to come and report it. Indeed, why should they, when no one had ever tried to put one out before?

There was literally nothing to work with - no knowledge of fire behavior; no training in the techniques of fire fighting; no record of sources of manpower or of means of transporting men and equipment to the fire; no sawmill or logging crews and no cooperators among local residents ready to drop their work and rush to the scene; no fuel-type maps or weather forecasts to tell how far the fire might spread or how difficult line-building might be; no equipment or even hand tools; and, of course, no smokejumpers, for it was nearly 30 years before this revolutionary method of getting men to fires in a hurry was even being considered.

To appreciate the difficulties of the situation facing me then, and similar situations confronting many others in those early years, one must remember that there were no planes or trucks or even cars for fast travel and transportation. There were but few miles of trails, low-standard ones at that, and almost no roads in the forested country. There was no such thing as radio, and telephone connections with people in the rural districts who might have been willing to help were almost entirely lacking.

There are many other ways in which those early rangers were shortchanged, but enough have been mentioned to form a basis for comparison with the problem of fire control as it is being met by present-day rangers. That great progress has been made is evident, outstandingly so in detection by lookouts and air patrol; in communication by telephone and two-way portable radio for communicating from field to headquarters or to lookouts and patrol planes; in special equipment such as hand tools, power saws, self-powered trench diggers, bulldozers and portable power pumps; in ready-packed and cargoes rations, beds, tools and mess equipment in convenient shape for packing on mules or dropping by parachute; and most important of all, in the training of the field-going and ranger headquarters personnel in everything that enters into doing a bangup job on every fire, little or big.

Of course, all this tremendous advance was not made at once, but has been attained by slow, painful and costly steps; slow because men had to learn by trial and error and because they lacked both funds and knowledge of what must be done; painful because of the mistakes and heartbreaks involved

in the handling of fires that got away; costly because of the millions spent in fighting fires and in the damage to timber, watershed, wildlife and aesthetic values.

In retracing these steps, we come first to the awful holocaust of August 1910 that snuffed out the lives of more than 80 fire fighters and laid waste half a million acres of timber.

This was not just a single fire at its beginning, but a sudden breaking away of many fires that had been burning for days. Men were on these fires or cutting their way to them when a gale of tornado-like force struck and sent them roaring and spotting ahead, fanning sparks into blazes and blazes into crown fires that joined other fires to form an almost solid front as it crossed the Bitterroot Mountains into Montana. It consisted of overheated air that swept up from the desert-like plains of central Washington and was almost entirely lacking in humidity. It was unforeseen because the weather-forecasting system that plays such a vital part in present-day fire fighting was not then in force.

On it swept, its progress greatly accelerated by burning fagots hurtling from exposed ridgetops out across intervening canyons to set new fires. These in turn quickly became crown fires that swept up to the next ridgetops to repeat the process. Entire wooded slopes and the headwaters of many branches of the Clearwater, St. Joe and Coeur d'Alene Rivers were blackened.

Where the wind got a clear sweep it pushed fingers out ahead of the main fire. One of these pointed toward the city of Missoula and came near enough to shower its streets with ashes and burned-out embers. Missoula is about 100 miles, air line, east of Wallace, Idaho, which, being hemmed in between very steep, heavily wooded slopes, caught fire and suffered heavy damage.

It is but natural to ask why this happened and to wonder whether it will ever happen again. This resolves itself into many specific questions, among which the one that bears most directly on the subject of progress in fire control is this: Why were so many fires still burning several days after the storm which set them? Before answering this question, let us try to frame a question so comprehensive that a single answer will cover its many elements, at least in a general way.

Why did those men have to die, literally burned at the stake, and all that valuable timber have to go up in smoke? The answer is that our Government waited too long before putting the forest lands of the West under protection. It waited too long because of the apathy or unawareness of the Members of Congress and of the people at large. The people of the West were too busy getting title to the land and exploiting the timber and other resources, and the people of the East were too far away to care.

To an extent and in a very general way this answers the specific question as to why so many fires were still burning when the gale hit, but because of its bearing on the progress that has been made toward adequate fire control, this question should be answered in more detail.

At that time few lookout stations had been established, due to lack of funds and time for building the trails and telephone lines to connect them, hence some fires doubtless had not even been discovered, and certainly others had not been discovered until they had spread to large

size. Some of the known fires were remote from trails and the crews sent to them had to fight their way through thick timber and undergrowth with their tools, food and beds on their backs. This meant delay.

Few men had had experience in fighting fires up to that time, and doubtless poor strategy and techniques accounted for delay in gaining control in some cases. Fighting forest fires is a science, and there had not been time enough to develop it when these men were confronted with the problem of where to begin and what kind of line it takes to hold fire from crossing it. They would, in most instances, have arrived at the fire nearly tired out, the less hardy ones exhausted even, with food not well adapted to the purpose and insufficient in quantity, and the location of water and a safe place to camp unknown to them. With a hundred or more fires widely distributed, it is not hard to explain why many of them would still be burning for days after the storm struck.

Other factors, chiefly that of morale of the men so hastily gathered, had their effect on the output of line built and held. The fact that fires were destroying the forest meant little or nothing to most people in those days. There had always been fires and always would be, they thought. Anyway, it was just a job to most of them, and unless there was the best of leadership - foremen who knew how to handle men - they would not deliver even a reasonable amount of fireline.

Regardless of the reasons, the fact that many fires were burning when the wind hit was the crux of the situation. Winds do not start fires, they only make them spread faster, and in case of forest fires the spread is often augmented greatly when flames reach the crowns where the wind has a clear sweep.

The lesson taught is that any time fires are burning out of control they are a hazard. In terms of action, this means simply that men must get to fires in the shortest possible time and put them dead out as quickly as possible. Back of that, of course, are many things - prompt discovery and reporting; fast travel and transportation of equipment; preparedness in all its details; and most important of all, men with the determination and know-how to make every fire a dead fire in the shortest possible time.

That was 1910. This is more than 40 years later, so we must push along to the next milestone by which to gage the progress from that time to the present. But, first a few lines about the men who, from day to day, came straggling out of the blackened waste, weak and emaciated from lack of food, feet burned and skin blistered, clothing in shreds, and faces bewhiskered and begrimed to the point of making them unrecognizable. The strong helped the weak up the steep slopes, over the down logs and through the roughest spots, but even they were scratched, bruised and limping at the finish.

With each new arrival came renewed hope for those still missing, but finally all hope had to be abandoned, and in its stead the most grueling task of all was faced - the search for and recovery of the bodies of those who perished.

Bodies were found widely separated - one here, two or three there, several close together elsewhere. Mostly they were along trails which they vainly hoped would lead them to safety, or in the beds of streams where they had submerged their bodies as the only chance of survival, only to be suffocated or scalded in the sizzling water as the burning embers dropped in around them.

Heroically, and methodically, the search went on until all were accounted for. But not all could be identified and some were not claimed by anyone, since they were transients with no next of kin known. It is gratifying to know that a sightly plot of ground was set aside for the burial of all the men whose relatives preferred it, as well as the unidentified, in the cemetery at St. Maries, Idaho. It was appropriately monumented and is scrupulously tended as a mark of respect to the men who, in life, essayed to save the forest from destruction by fire but were themselves destroyed by it.

Among the bodies recovered were those of 5 men taken from the shallow tunnel into which the heroic Ranger Pulaski took his crew of 40 men as the only chance of survival. The tunnel's entrance was at the bottom of a canyon whose slopes on either side were very steep and heavily wooded. As the fire passed over, great trees, uprooted or broken off by the gale, tumbled or slid down, creating a veritable furnace around the mouth of the tunnel that exhausted all the oxygen. As breathing became difficult the men instinctively fought to get out. That would have meant certain death, but Pulaski held them back at gunpoint and commanded them to lie down and suck air from the damp floor of the tunnel. Finally, quiet reigned and Pulaski lay down in the most exposed position, the last he remembered until several hours later when the fire had pretty well burned itself out. He was awakened by men crawling out over his body and heard one of them say, "Too d----d bad, the ranger is dead."

As might be guessed, all the men became unconscious. All regained consciousness but 5, and after all efforts to revive them failed and it became light enough to see to find his way, Pulaski led and helped the others down over or under the charred timbers and around the boulders that had tumbled down to obstruct the trail. At last they reached Wallace, and to its citizens who knew their approximate whereabouts and had given up all hope of their escape, it was like seeing them rise from the dead. Pulaski nearly lost his sight from exposure to the heat and glare as he stood guard at the mouth of that tunnel, and carried other ill effects to the day of his death.

The next yardstick by which progress toward adequate fire*control can be measured is provided by the near-rainless summers of 1917 and 1919, but preliminary to any discussion of them it is necessary to explain how the awful 1910 fires were put out. It certainly was not by anything men did, or could have done. Those fires were stopped dead in their tracks by a change in the weather as sudden as was that which started them on the rampage. It rained for days, and although the break came some 10 days earlier than normal, the fuels never became dry enough to let them start up again. As a consequence, little was learned about the strategy and technique of fighting fires in times of high fire danger.

Likewise, little was learned from the intervening years, 1911 to 1916, because burning conditions never became dangerous; hence, the critical season of 1917 presented the first real test of men's ability to cope with such situations as periodically occur here. The result was far from satisfactory, in that some fires burned out of control for days and the costs and damages were too great to be tolerated.

The same was true of 1919, largely because there had not been time or money enough to put into practice the lessons learned in 1917. It is true that many lookouts had been established and many miles of trails built since

1910, but these facilities were still vastly inadequate for insuring prompt discovery and early arrival at all fires. Again costs and damages were insufferable, and no small part of this was due to failure to apply correct methods to the job of building and holding firelines against any unpredicted worsening of burning conditions.

As money was made available and knowledge of what was needed grew, these weaknesses were remedied. Nevertheless, in 1925 when a heavy concentration of lightning fires occurred in the Idaho forests, it was necessary for men and pack stock to trek as long as three days over steep, rocky, dusty trails in going to their aid. Had the present system of roads, built largely by the CCC boys during the depression, been in existence then, those men, pack mules and all necessary equipment could have been whisked over to those fires in six hours. Moreover, the men would have arrived fresh and ready for long hours of hard work instead of in such footsore and exhausted condition that they were only 50 percent effective at the start.

Next came the disastrous season of 1926, when lightning in successive blasts set more than 100 fires on the Kaniksu Forest alone. Men and equipment were rushed to the scene, but several of the fires got badly out of hand and burned for days, proving that many of the essentials for successfully dealing with such situations were still lacking. Aside from the woeful lack of roads and trails, there was a lack of plans prepared in advance for dispatching experienced smokechasers from nearby forests, with the result that an unusually large percentage of the fires spread to large size before men got to them. This in turn overtaxed the available manpower and overhead. Above all, 1926 showed that not enough emphasis had been placed on training men in the techniques of fire fighting. The fight lasted for days, and again the costs and damages were intolerable from the standpoint of utilizing the timber instead of allowing it to burn up.

Efforts to remedy the deficiencies shown by the 1926 fires were earnestly pursued, but the tremendous acreage burned in the Half-Moon, Lochsa and other fires in 1929, and in the Pete King fire in 1934, showed there was still a long way to go.

Space does not permit describing these fires in detail. Suffice to say that the Half-Moon Fire was carried in from outside the Flathead Forest, in a gale similar to that of 1910, and traveled clear across the forest and into Glacier Park where it did much damage to scenic values around the West Entrance and along the shores of Lake McDonald. It traveled more than 30 miles in runs on 2 successive days and crossed 3 mountain ranges and the Flathead River. It took nearly 100 miles of fireline to corral it, and required about 1,000 men a week to bring it entirely under control. Forest officers for overhead were flown in from the other regions, some as far away as Arizona and New Mexico. It was a costly fire from all standpoints.

The Pete King Fire was started by lightning in July, burned over the major portion of the lower Lochsa and Selway River drainages, and was never fully controlled until the autumn rains came to aid the weary men at a task that had proved too much for them during the weeks of severe burning conditions. At its height nearly 5,000 men, mostly CCC boys, were on the job, and overhead was drawn from other forests, other regions, and even from the Washington office to help plan the action and handle the crews on the line.

It was only logical that by common consent these men decided to take a new look at the entire fire problem and setup in Region 1. When a fire spreads to such large size, it becomes several fires so far as decisions as to strategy and line construction are concerned, consequently, the men carried away from this fire and into a subsequent meeting widely divergent notions of what went wrong with the overall action. There was agreement, however, that the fundamental remedy lay in getting to all fires in time with enough men, properly equipped and well handled, to control them before they spread to large proportions.

This sounds simple, but its accomplishment involves many things, chief of which is an ever-vigilant alertness to any buildup of the danger of fires spreading rapidly, as determined by the measured dryness of fuels, air humidity, and the day-to-day weather forecasts; readiness in all respects for shifting men and equipment to areas of heavy lightning fire concentrations to relieve the overload; and most important of all, a rigid program of training of all field-going and ranger headquarters personnel.

Much of this training can be done in advance of the fire season in groups before the lookouts, smokechasers and maintenance crews go on the job, but unless that is followed by the most thorough checkup of performance right on the job, weak links are nearly sure to develop and give way at an inopportune time with the result of another disastrous fire.

Every man responsible for initiating action on a spreading fire must do a first-class job of sizing up the manpower requirements for controlling it before noon the next day. He must take into account the length of line to be built and the output per man hour in the kind of timber and ground cover at that particular place, and he must make an accurate estimate of the time of arrival of the men. Other factors too numerous to mention must enter into his calculations, and when he arrives at the final figure he will be well advised to apply a safety factor, for the difference between a few too many men and not quite enough men may mean the difference between a fire brought under control quickly at small cost and little damage as against another Pete King fire.

The preceding formula for guaranteeing that there shall never again be such disastrous fires as those heretofore described takes full advantage of hindsight. For just such a program was launched in Region 1 in 1935 and has been rigidly followed ever since. That it has been effective is indicated by the statistics covering the area burned, suppression costs, and damages since 1935 as compared with the preceding 6 years.

Here are the figures:

	<u>1929</u>	<u>1934</u>	<u>6 yr. total</u>	<u>6 yr. average</u>	<u>1935-52 18 year total</u>	<u>1935-52 average</u>
Acres burned	326,000	348,000	894,000	149,000	259,000	14,400
Damage (est.)	\$2,160,000	462,000	4,672,000	778,000	1,486,000	82,600
Fight- ing	\$1,458,000	1,216,000	4,906,000	778,000	1,486,000	409,000

Note: All the above figures in round numbers.

The above comparison should take into account the greatly increased costs of everything that enters into fire fighting in the last 12 of the 18-year period; also, in the basis for estimating damages, inasmuch as stumpage values have quadrupled since the last World War. These facts make the comparison still more favorable as to the quality of performance during the 18-year period as a whole.

There is a noticeable tendency to attribute the better showing of the last 18 years largely to comparatively less severe burning conditions. But, while that accounts for it in part, it must be recalled that 1936 was the worst in that respect ever experienced on some of the forests east of the Continental Divide, and also because of a long history of few fires and little damage there, preparedness to cope with the 1936 situation was inadequate. It should be remembered also that 1940 had more fires in the region as a whole than 1929 and 1934 put together, or almost 3 times the yearly average that occurred prior to 1935. In 3 other seasons, 1946-47-49, the number of fires far exceeded the average for the 6-year period of 1929-34 inclusive. The number of fires is in itself an indication of both the dryness of fuels and the concentrations of lightning fires, and, therefore, is an important factor in gaging the quality of performance.

There is also a tendency to credit the better showing of the last 18 years to the smokejumpers, but while they deserve much credit it must be remembered that during the first 9 years of that period they were not in the picture; yet, the area burned in the 2 critical years of 1936 and 1940 was less than one-sixth of that burned in the 2 critical years of 1929 and 1934, while the cost of fire fighting was almost a million dollars less than for the 2 earlier years.

It is only natural for the lay mind to overrate the relative importance of the smokejumpers in the overall job of fire control. When initiated, this daring and spectacular innovation appealed to the imagination and was made the subject of rather widespread publicity in the press and over the radio. They are a vital factor now, and will become increasingly so in the future, and while it is scarcely possible to pay too great a tribute to these hardy young chaps and the men who train them, and the pilots who fly them, it is well to recognize the practical limitations of this method of getting on top of a heavy concentration of lightning fires such as are common here.

In the first place, there are not enough of them, and this makes it necessary to send ground forces to their fires both as a safety measure and to relieve them at the earliest possible time so they can get back to their base and be ready to go again. In the second place, most fires can be reached quickly enough for safe handling by ground forces at a small fraction of the cost, and cost is a consideration that must not be overlooked. Thirdly, there is an element of uncertainty as to whether many of the jumpers may be out of reach just when a deluge of lightning fires hit a particular district. For while they are regularly headquartered at Missoula, they serve all the western regions, which spreads the 150 men in the unit altogether too thin at times -- to thin even for Region 1 alone, as was demonstrated in the critical season of 1953.

As a report on progress in fire control, from a state of total unpreparedness at the beginning to a state of adequate preparedness now, little more need be said. But what of the future? Lightning will continue to strike. People in ever-increasing numbers will continue to go into the forests with their matches and cigarettes and cooking fires; and some of them, in

spite of all that can be done to warn them of the danger and try to teach them how to avoid starting a fire, will not learn how or will not take the trouble to make sure they will not be offenders.

In short, so long as our forests last we shall have fires to fight. And just that long must we have men, trained to a high degree of efficiency, armed with the most up-to-date equipment, alert and ever-ready to get to fires at the earliest possible moment and do the right thing in the right way when they get there. This costs real money, but as shown by the statistics quoted above, it is cheaper by half at the time, and surely it is cheaper a hundred-fold in the long run.